

SCOPE OF ACCREDITATION FOR CALIBRATION LABORATORY No AP 173

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 AP 173	Name and address SONEL S.A. TESTING AND CALIBRATION LABORATORY Wokulskiego Street 11 58-100 Świdnica
Activity conducted: at permanent location (S)	Calibration: number and name of mesurand^{*)} 7.01 voltage DC^{*)} 7.02 current DC^{*)} 7.03 voltage AC^{*)} 7.04 current AC^{*)} 7.05 resistance DC^{*)} 7.06 resistance AC^{*)} 7.07 impedance^{*)} 7.13 power AC^{*)} 10.01 time (interval)^{*)} 10.02 frequency^{*)} 19.03 temperature (radiation thermometry)^{*)}

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^{*)} The numbering of mesurand in accordance with the classification given in the Annex to document DAP-04, available at PCA website www.pca.gov.pl

This document is an annex to accreditation certificate No AP 173 of 05.03.2020
Accreditation cycle from 03.02.2021 to 01.03.2025

The status of accreditation and validity of the scope of accreditation can be confirmed at PCA website www.pca.gov.pl

Testing and Calibration Laboratory Wokulskiego 11, 58-100 Świdnica				
Object of calibration /measuring	Measurement range	Measurement uncertainty for CMC	Place of activity	Identyfication of the method
Voltage (DC)				
• digital voltmeters • multimeters • meters for electrical installation parameters • clamp meters	0,2 mV ÷ 1000 V (0,2 ÷ 200) mV (0,2 ÷ 2) V (2 ÷ 20) V (20 ÷ 200) V (200 ÷ 1000) V	0,001 % + 0,6 µV 0,001 % + 0,3 µV 0,0015 % + 0,6 µV 0,0015 % + 0,03 mV 0,0015 % + 0,9 mV	S	Internal procedure IW01 Based on EURAMET cg-15 v. 3.0 Direct method
• calibrators • referece sources	10 mV ÷ 1000 V (10 ÷ 200) mV (0,2 ÷ 1000) V	0,0005 % 0,0004 %		Internal procedure IW02 Direct method
Current (DC)				
• digital ammmeters digital current meters • multimeters • meters for electrical installation parameters	2 µA ÷ 20 A (2 ÷ 200) µA (0,2 ÷ 2) mA (2 ÷ 20) mA (20 ÷ 200) mA (0,2 ÷ 2) A (2 ÷ 20) A	0,005 % + 0,2 nA 0,004 % + 6 nA 0,004 % + 60 nA 0,008 % + 1,3 µA 0,02 % 0,04 %	S	Internal procedure IW01 Based on EURAMET cg-15 v. 3.0 Direct method
• clamp meters	10 mA ÷ 2000 A	0,07 %		Internal procedure IW02 Direct/indirect method
• calibrators	2 µA ÷ 20 A 2 µA ÷ 200 mA (0,2 ÷ 2) A (2 ÷ 20) A	0,004 % 0,02 % 0,05 %		
Voltage (AC)				
• digital voltmeters • multimeters • meters for electrical installation parameters • clamp meters	0,2 mV ÷ 1000 V 10 Hz ÷ 40 Hz (10 ÷ 200) mV (0,2 ÷ 2) V (2 ÷ 20) V 40 Hz ÷ 10 kHz (0,2 ÷ 200) mV (0,2 ÷ 2) V (2 ÷ 20) V (20 ÷ 200) V (200 ÷ 1000) V 10 kHz÷100 kHz (0,2 ÷ 200) mV (0,2 ÷ 2) V (2 ÷ 20) V (20 ÷ 300) V	0,021 % 0,015 % 0,016 % 0,04 % + 12 µV 0,025 % + 40 µV 0,025 % + 0,4 mV 0,02 % + 0,3 mV 0,025 % + 4 mV 0,06 % + 15 µV 0,04 % + 70 µV 0,045 % + 0,8 mV 0,04 % + 7 mV	S	Internal procedure IW01 Based on EURAMET cg-15 v. 3.0 Direct method
• RCD testers	(0 ÷ 100) V	0,25%		Internal procedure IW09 Direct method
• calibrators	10 mV ÷ 1000 V 40 Hz ÷ 100 Hz (10 ÷ 200) mV (0,2 ÷ 200) V (200 ÷ 1000) V 100 Hz ÷ 2000 Hz (10 ÷ 200) mV (0,2 ÷ 200) V (200 ÷ 1000) V 2 kHz ÷ 10 kHz (10 ÷ 200) mV (0,2 ÷ 200) V (200 ÷ 1000) V 10 kHz ÷ 30 kHz (10 ÷ 200) mV (0,2 ÷ 200) V (200 ÷ 1000) V 30 kHz ÷ 100 kHz (10 ÷ 200) mV (0,2 ÷ 200) V (200 ÷ 1000) V	0,05 % 0,011 % 0,015 % 0,031 % 0,01 % 0,015 % 0,014 % + 0,004 mV 0,012 % 0,013 % 0,034 % + 0,008 mV 0,024 % 0,026 % 0,077 % + 0,02 mV 0,067 % 0,077 %		Internal procedure IW02 Direct/indirect method

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Object of calibration /measuring	Measurement range	Measurement uncertainty for CMC	Place of activity	Identifcation of the method
Current (AC)				
- digital ammeters digital current meters - multimeters - meters for electrical installation parameters	10 μA ÷ 150 A 10 Hz ÷ 1 kHz (10 ÷ 200) μA (0,2 ÷ 200) mA (0,2 ÷ 2) A (2 ÷ 20) A (20 ÷ 150) A (1 ÷ 5) kHz (10 ÷ 200) μA (0,2 ÷ 200) mA (0,2 ÷ 2) A (2 ÷ 10) A	 0,068 % 0,057 % 0,042 % 0,061 % 0,2 % 0,045 % 0,03 % 0,062 % 0,12 %	S	Internal procedure IW01 Based on EURAMET cg-15 v. 3.0 Direct method Internal procedure IW09 Indirect method RCD setting current measurement
clamp meters	10 mA ÷ 1900 A 10 Hz ÷ 1 kHz 10 mA ÷ 1000 A (1000 ÷ 1900) A	 0,15 % 0,06 %		Internal procedure IW01 Based on EURAMET cg-15 v. 3.0 Direct method
calibrators	10 μA ÷ 100 A 40 Hz ÷ 1 kHz (10 ÷ 200) μA (0,2 ÷ 200) mA (0,2 ÷ 2) A (2 ÷ 20) A (1 ÷ 10) kHz (10 ÷ 200) μA (0,2 ÷ 200) mA (0,2 ÷ 2) A (2 ÷ 20) A (10 ÷ 20) kHz (0,2 ÷ 200) mA 50 Hz / 60 Hz (2 ÷ 100) A	 0,061 % 0,03 % 0,04 % 0,1 % 0,25 % 0,13 % 0,16 % 0,35 % 0,17 % 0,05 %		Internal procedure IW02 Direct/indirect method
portable appliance testers (substitute leakage current)	0,04 ÷ 20 mA	1% + 0,01 mA		Internal procedure IW01 Substitute leakage current Direct method
Resistance (DC)				
- digital resistance meters - multimeters	20 μΩ ÷ 1100 MΩ 20 μΩ 80 μΩ 150 μΩ 375 μΩ 750 μΩ (0,001 ÷ 1) Ω (0,1 ÷ 10,9999) Ω (11 ÷ 32,9999) Ω (33 ÷ 109,9999) Ω (110 ÷ 329,9999) Ω 330 Ω ÷ 1,0999999 kΩ (1,1 ÷ 3,299999) kΩ (3,3 ÷ 32,99999) kΩ (33 ÷ 109,9999) kΩ (110 ÷ 329,9999) kΩ 330 kΩ ÷ 1,0999999 MΩ (1,1 ÷ 3,299999) MΩ (3,3 ÷ 10,99999) MΩ (11 ÷ 32,99999) MΩ (33 ÷ 109,9999) MΩ (110 ÷ 329,9999) MΩ (330 ÷ 1100) MΩ	 0,3 % 0,1 % 0,3 % 0,3 % 0,3 % 0,02 % 0,03 % 0,008 % 0,008 % 0,005 % 0,005 % 0,005 % 0,005 % 0,005 % 0,005 % 0,008 % 0,02 % 0,05 % 0,06 % 0,4 % 2 %	S	Internal procedure IW01 Based on EURAMET cg-15 v. 3.0 Direct method
insulation resistance meters	50 kΩ ÷ 20 TΩ measuring voltage up to 15 kV 50 kΩ ÷ 10 TΩ 11 TΩ 20 TΩ	 0,6 % 0,5 % 0,5 %		Internal procedure IW01 Based on EURAMET cg-15 v. 3.0 Direct method

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Object of calibration /measuring	Measurement range	Measurement uncertainty for CMC	Place of activity	Identification of the method
- shunts - resistance standards - adjustable resistors - resistance calibrators	20 $\mu\Omega$ ÷ 20 G Ω (20 ÷ 80) $\mu\Omega$ 80 $\mu\Omega$ ÷ 0,01 Ω (0,01 ÷ 0,1) Ω (0,1 ÷ 2) Ω (2 ÷ 20) Ω 20 Ω ÷ 200 k Ω 200 k Ω ÷ 2 M Ω (2 ÷ 20) M Ω (20 ÷ 200) M Ω 200 M Ω ÷ 2 G Ω (2 ÷ 20) G Ω	0,1 % 0,06 % 0,02 % 0,002 % 0,002 % 0,002 % 0,003 % 0,004 % 0,006 % 0,01 % 0,11 %		Internal procedure IW02; IW04 Direct/indirect method
- resistance standards - adjustable resistors - resistance calibrators	50 k Ω ÷ 42 T Ω measuring voltage up to 15 kV 50 k Ω ÷ 2,2 T Ω (2,2 ÷ 10) T Ω 11 T Ω 20 T Ω measuring voltage up to 1 kV (20 ÷ 42) T Ω	0,6 % 0,5 % 0,5 % 0,5 % 2,6 %		Internal procedure IW03 Indirect method
Resistance AC				
- digital resistance meters - meters for electrical installation parameters	0,1 Ω ÷ 19,9 k Ω (0,1 ÷ 0,4) Ω (0,4 ÷ 3) Ω 3 Ω ÷ 19,9 k Ω	0,7 % 0,6 % 0,15 %	S	Internal procedure IW01 Based on EURAMET cg-15 v. 3.0 Direct method
- short-circuit loop impedance meters - RCD testers	100 m Ω ÷ 2 k Ω (100 ÷ 250) m Ω (250 ÷ 1000) m Ω (1000 ÷ 2000) m Ω (2 ÷ 19) Ω 19 Ω ÷ 2 k Ω	0,6 % 0,3 % 0,12 % 0,3 % 0,06 %	S	Internal procedure IW07; IW09 Direct method
- digital resistance meters - portable appliance testers	20 m Ω ÷ 30 Ω (current up to 25) (20 ÷ 50) m Ω 50 m Ω ÷ 30 Ω	2 % 1 %	S	Internal procedure IW01 Based on EURAMET cg-15 v. 3.0 Direct method
Impedance				
- impedance meters - meters for electrical installation parameters	100 m Ω ÷ 2 k Ω (100 ÷ 250) m Ω (250 ÷ 1000) m Ω (1000 ÷ 2000) m Ω (2 ÷ 19) Ω 19 Ω ÷ 2 k Ω	0,6 % 0,3 % 0,12 % 0,3 % 0,06 %	S	Internal procedure IW07 Direct method
- earth resistance meter - meters for electrical installation parameters (impedance measurement impuls method)	0,2 ÷ 200 Ω	1% + 0,1 Ω		Internal procedure IW07 Impedance measurement impuls method Direct method
Power AC				
- digital single-phase active power meters - digital three-phase active power meters	100 W ÷ 150 W f = (40 ÷ 70) Hz (1 ÷ 1000) A (100 ÷ 500) V	0,05 % (cos ϕ = 1)	S	Internal procedure IW11 Direct method
- digital single-phase apparent power meters - digital three-phase apparent power meters	100 VA ÷ 150 kVA f = (40 ÷ 70) Hz (1 ÷ 1000) A (100 ÷ 500) V			
Time (interval)				
meters for electrical installation parameters	(5 ÷ 1000) ms (5 ÷ 190) ms (190 ÷ 390) ms (390 ÷ 1000) ms	1,1 ms 1,2 ms 8,2 ms	S	Internal procedure IW09 Direct method
Frequency				
- meter for electrical installation parameters - multimeters - digital frequency meters	10 Hz ÷ 500 kHz (10 ÷ 100) Hz (100 ÷ 1000) Hz (1 ÷ 10) kHz (10 ÷ 100) kHz (100 ÷ 500) kHz	3·10 ⁻⁶ ·f f – measured frequency	S	Internal procedure IW10 Direct method
Temperature (radiation thermometry)				
pyrometers (including radiation pyrometers, photoelectric, multiband, cameras thermovision)	(0 ÷ 500) °C (0 ÷ 50) °C (50 ÷ 100) °C (100 ÷ 400) °C (400 ÷ 500) °C	1,1 °C 1,4 °C 1,6 °C 3,5 °C	S	Internal procedure W06

The Calibration and Measurement uncertainty for CMC is the expanded uncertainty at a confidence level of app. 95 %. Value expressed as a percentage refers to the percentage of the measured value. In other cases, the CMC is expressed in units of the measured value.

List of changes

Accreditation Scope No. AP 173

Status of changes: the original version - A